Vision: Excellence in Science & Operations – Doing our Science Work Safely

Department of Energy Executive Safety Conference

Office of Science Safety Management

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SC BOTTOM LINE ON SAFETY MANAGEMENT

SC seeks excellence in science & safety.

- Different parts of DOE raise different challenges
  - SC Labs are Rich in Research Variety
  - Users bring Variety of Cultures
- ISM is An Effective Approach
  - Presents Framework for Tailoring & Learning
  - Provides & Promotes Continuous Improvement
- SC Management Believes that Excellence in Safety is Necessary for Excellence in Science
  - Provides Leadership & Measures Performance against Expectations
  - Learns from Performance to Improve ISM effectiveness while seeking efficiency in operations

The "Work" of the Office of Science

- Supports basic research that underpins DOE missions
- Constructs and operates large scientific facilities for the U.S. scientific community
  - **Accelerators, light sources, neutron sources, materials characterization facilities, fusion & plasma physic facilities**
- Provides institutional oversight & infrastructure support to ten DOE laboratories and one Institute
- Serves as LPSO, CSO and PSO, as assigned

Department of Energy Field Reporting Relationships

- The Director of the Office of Science serves as **Lead Program Secretarial Officer** for:
  - Chicago Operations Office
  - Berkeley Site Office
  - Oak Ridge Operations Office
  - Stanford Site Office

- Laboratories that report to and are accountable to the Director of the Office of Science, as **Cognizant Secretarial Officer:**

- **SC Multi-program Labs**
  - Argonne National Lab
  - Brookhaven National Lab
  - Lawrence Berkeley National Lab
  - Oak Ridge National Lab
  - Pacific Northwest National Lab

- **SC Program Dedicated Labs**
  - Ames Lab
  - Fermi National Accelerator Lab
  - Princeton Plasma Physics Lab
  - Stanford Linear Accelerator Center
  - Thomas Jefferson National Accelerator Facility

Key SC Management Roles & Responsibilities

- **As LPSO, has overall ownership role for assigned Field Offices**
  - **Looks at how well DOE Federal Field Offices carry out their assigned Roles and Responsibilities**
  - **Ensures field input on proposed policy guidance/direction**
  - **Helps resolve disputes among CSOs/PSOs and field offices**
- **As CSO for assigned Multi-Program Laboratory, SC Director**
  - **Assumes line accountability for operational performance of the assigned Labs**
  - **Serves as landlord for the for the bounded set of facilities performing work for other PSOs**
- **As PSO "customer", SC Director**
  - **Provides program policy, budget development, technical direction, and oversight in keeping with CSO' site/facility wide operational programs**

Key SC ISM Roles & Responsibilities

- **SC Director**
  - **Sets SC-wide expectations and goals**
  - **Appraises performance of SC Program Associate Directors and SC Field Office Managers**
- **SC Program Associate Directors are Stewards and/or Sponsors**
  - **Set landlord expectations and goals**
  - **Maintain executive-level awareness of work, hazards & controls and safe work performance**
- **SC Field Office Managers**
  - **Ensure credible processes at the Labs to identify & analyze hazards, and implement controls**
  - **Administer contracts, conduct operational oversight of labs and assess operational performance**
- **Laboratories**
  - **Plan work with appropriate ES&H controls**
  - **Do work safely**
  - **Self-assess against contract agreements**
  - **Continually improve**

Nature of SC Research

- **Variety of Worker Environments**
  - **Accelerators**
  - **Synchrotron Light Sources**
  - **Neutron Sources**
  - **Large Fusion Experiments**
  - **Small-experiment Labs**
- **Variety of Hazards**
  - **Construction**
  - **Electrical**
  - **Mechanical**
  - **Chemical**
  - **Radiological**
  - **Nuclear**
- **Changing Conditions call for Continuous Management**
  - **Experiments change frequently**
  - **External Users come from a variety of safety cultures**

ISM Approach Matches SC Research Environments & Dynamics

- **ISM**
  - **DEFINING THE SCOPE OF WORK**
  - **IDENTIFYING & ANALYZING HAZARDS**
  - **DEVELOPING & IMPLEMENTING CONTROLS**
  - **PERFORMING WORK AS AUTHORIZED**
  - **MEASURING FOR FEEDBACK & IMPROVEMENT**

USER FACILITIES: A CASE STUDY IN SC SAFETY MANAGEMENT CHALLENGES

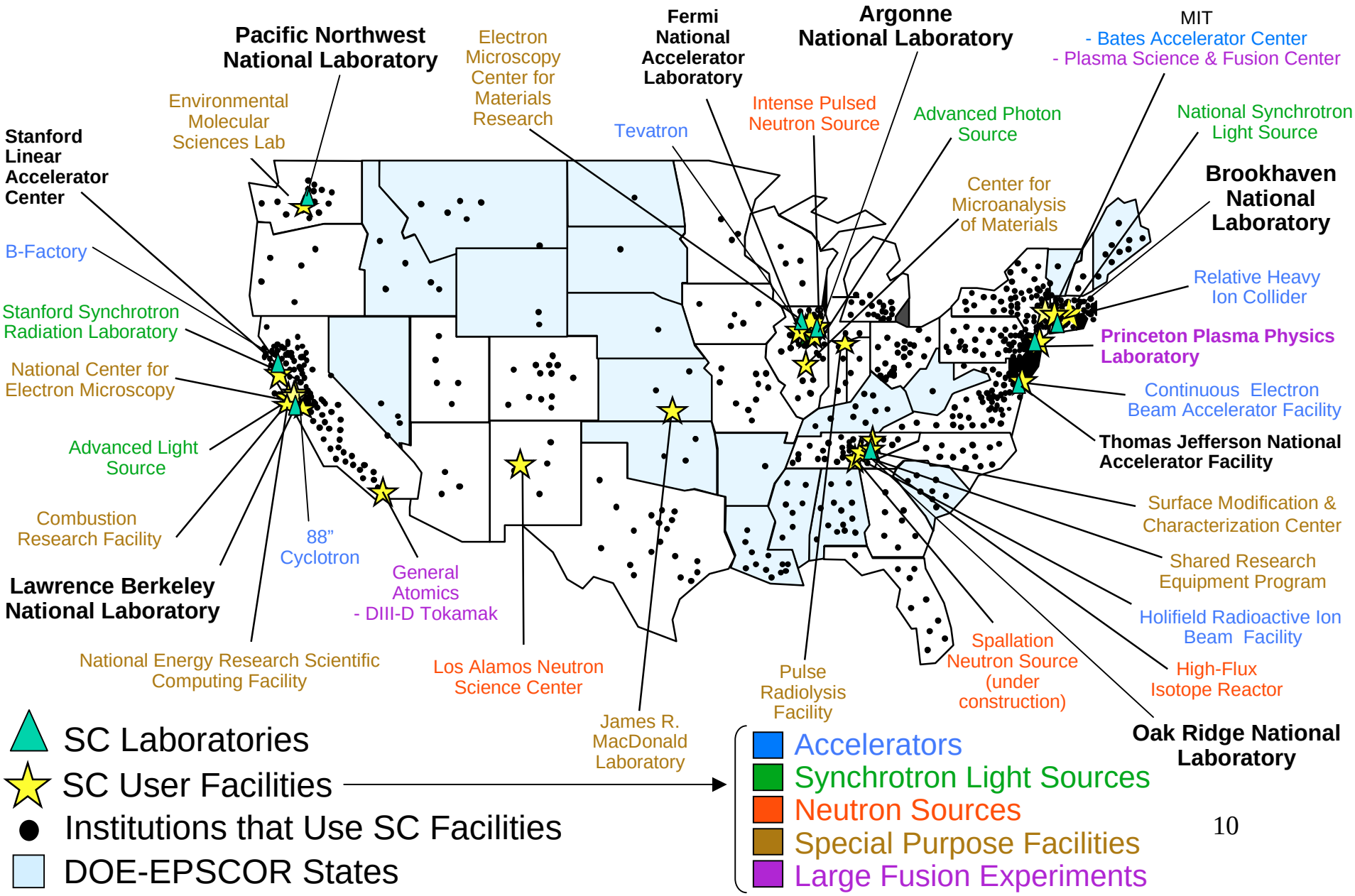
- BROOKHAVEN NATIONAL LAB:
  - National Synchrotron Light Source

VARIETY OF EXPERIMENTS, HAZARDS, & WORKERS

- Map of U.S. User Facilities & Institutional Users
- Changing types of research and level of use

TEMPORAL ASPECT OF EXPERIMENTS AND RESEACHER USE (ON-SITE PRESENCE) IS FROM A FEW DAYS TO MONTHS TO YEARS

Office of Science Scientific User Facilities and the Institutions That Utilize Them



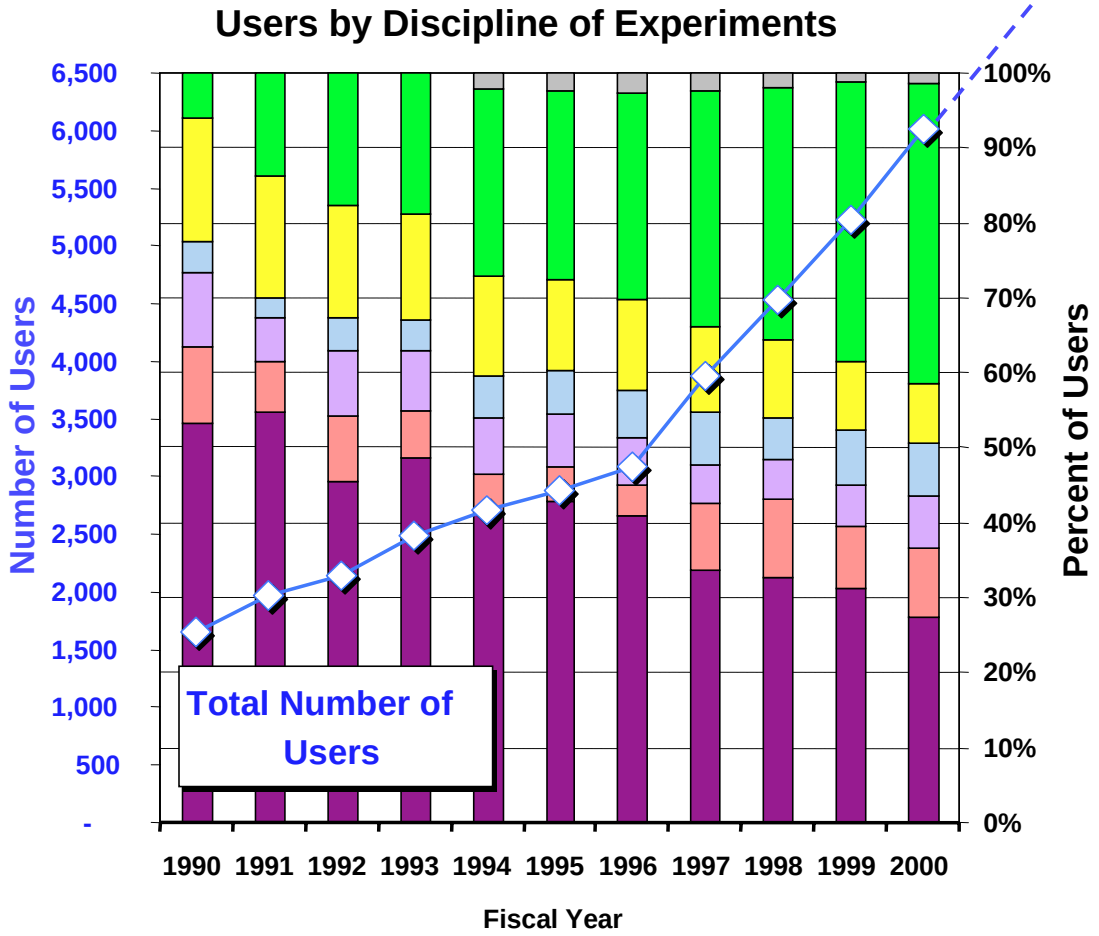
The Users of Synchrotron Light Sources

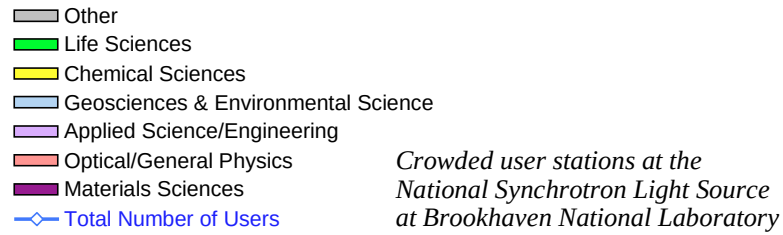
(From "province of specialists" in the 1980s to a widely used tool in the 21st Century)

Who funds research at the light sources?

BES provides the complete support for the operations of these facilities. Furthermore, BES continues as the dominant supporter of research in the physical sciences, providing as much as 85% of all federal funds for beamlines, instruments, and PI support. Many other agencies, industries, and private sponsors provide support for instrumentation and research in specialized areas such as protein crystallography.

The number of researchers using the synchrotron radiation light sources is expected to reach ~11,000 annually when beamlines are fully instrumented.





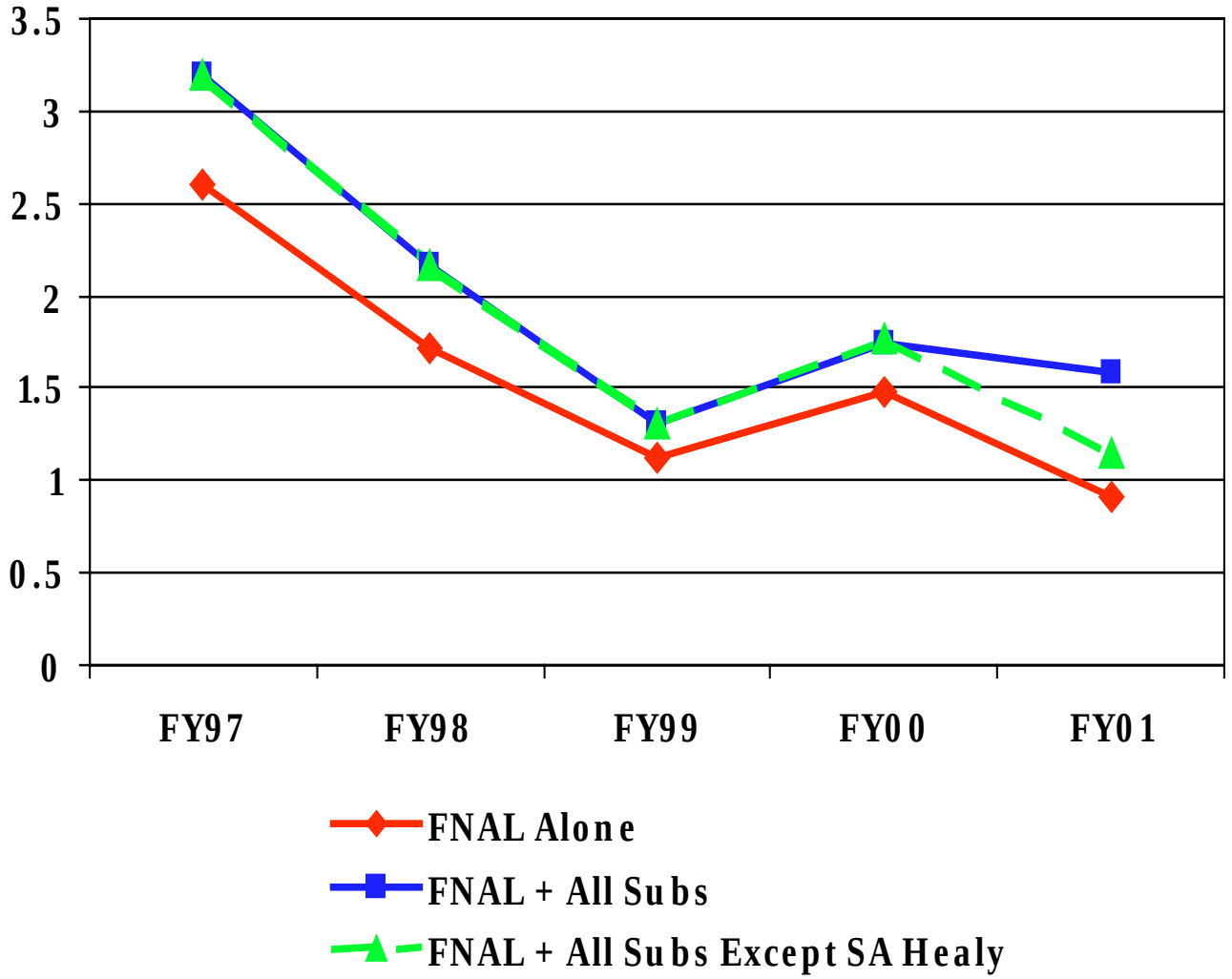
Crowded user stations at the National Synchrotron Light Source at Brookhaven National Laboratory

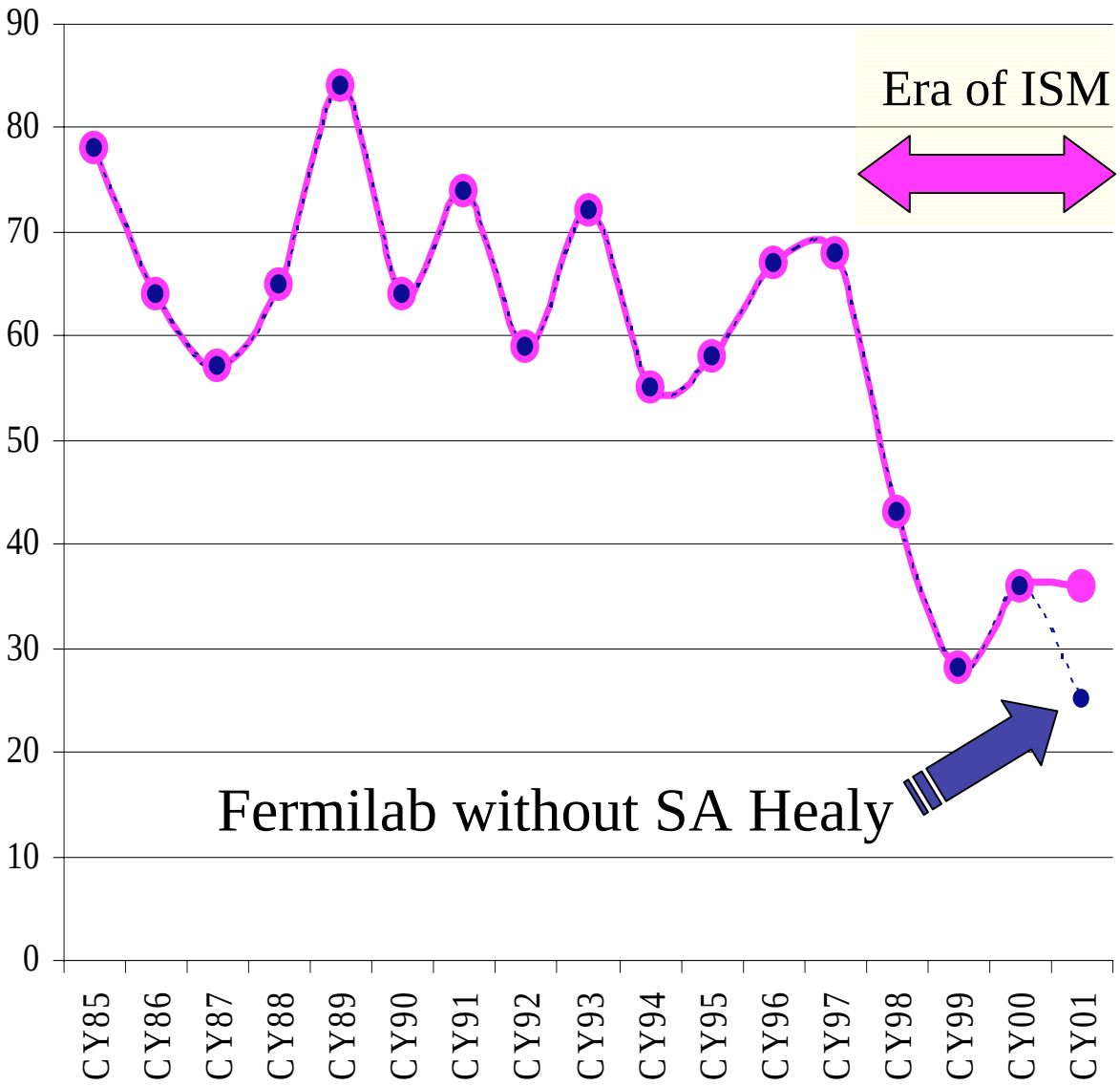
USE OF METRICS

- FERMI LAB EXAMPLE
  - IMPROVEMENTS WITH ISM
  - ACTIVE MANAGEMENT OF SUB-CONTRACTORS?
- LAB OPERATING PAGES
  - SC EXECUTIVE LEVEL AWARENESS TOOL
  - ACTIVE MANAGEMENT
- TOPICAL EVALUATIONS
  - SC RAD CONTROL PERFORMANCE
  - ACTIVE MANAGEMENT

SAFETY MANAGEMENT IS ABOUT THINKING & LEARNING

Fermilab Lost Workday Case Rates

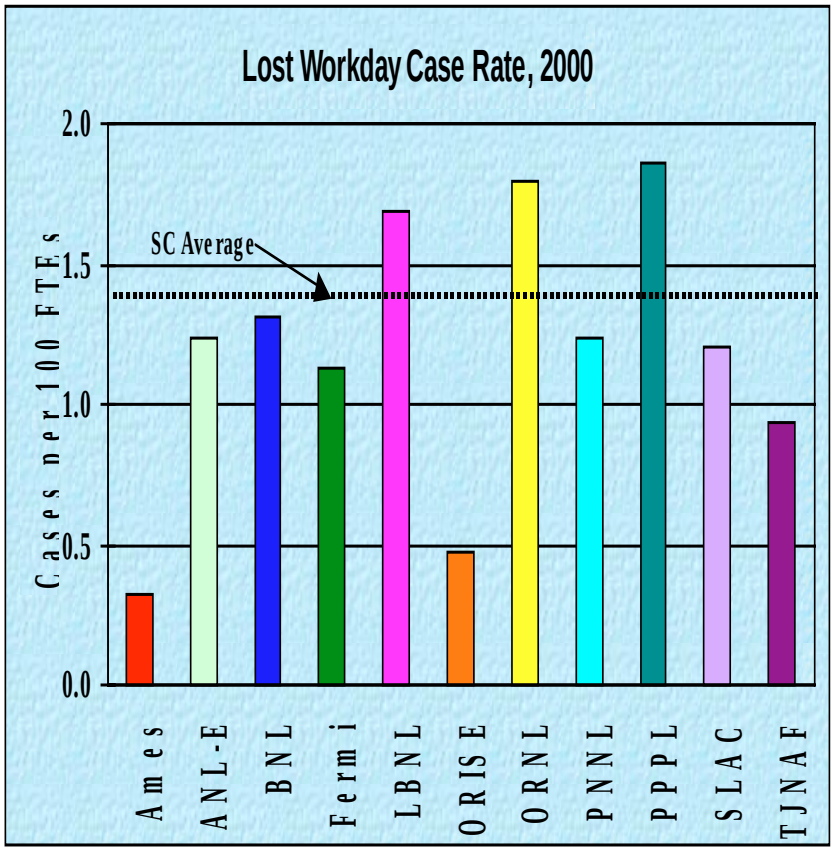


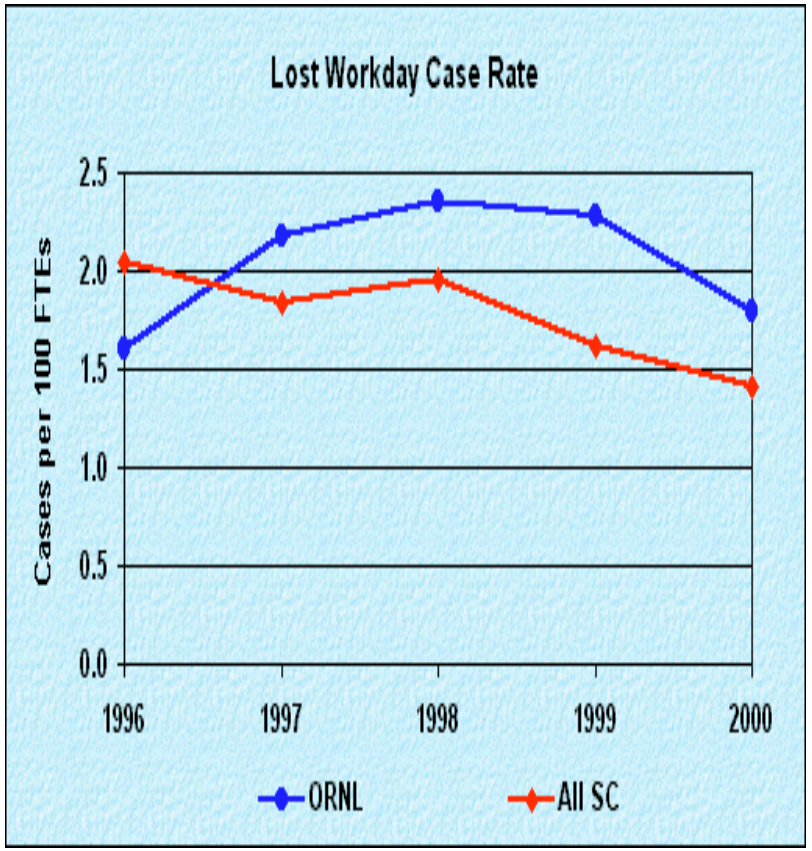


Since Lab & Subcontractor Employees indoctrinated in ISM, lost time injuries reduced by factor of two over previous 10-year average; for Lab employees alone, lost time injuries reduced by ~ factor of three.

Lost Workday Cases/Year for Fermilab & Subs

SC MANAGEMENT TOOLS: LAB OPERATING PAGES





Occupational Radiation Exposures At SC Laboratories

Goals

Number Monitored

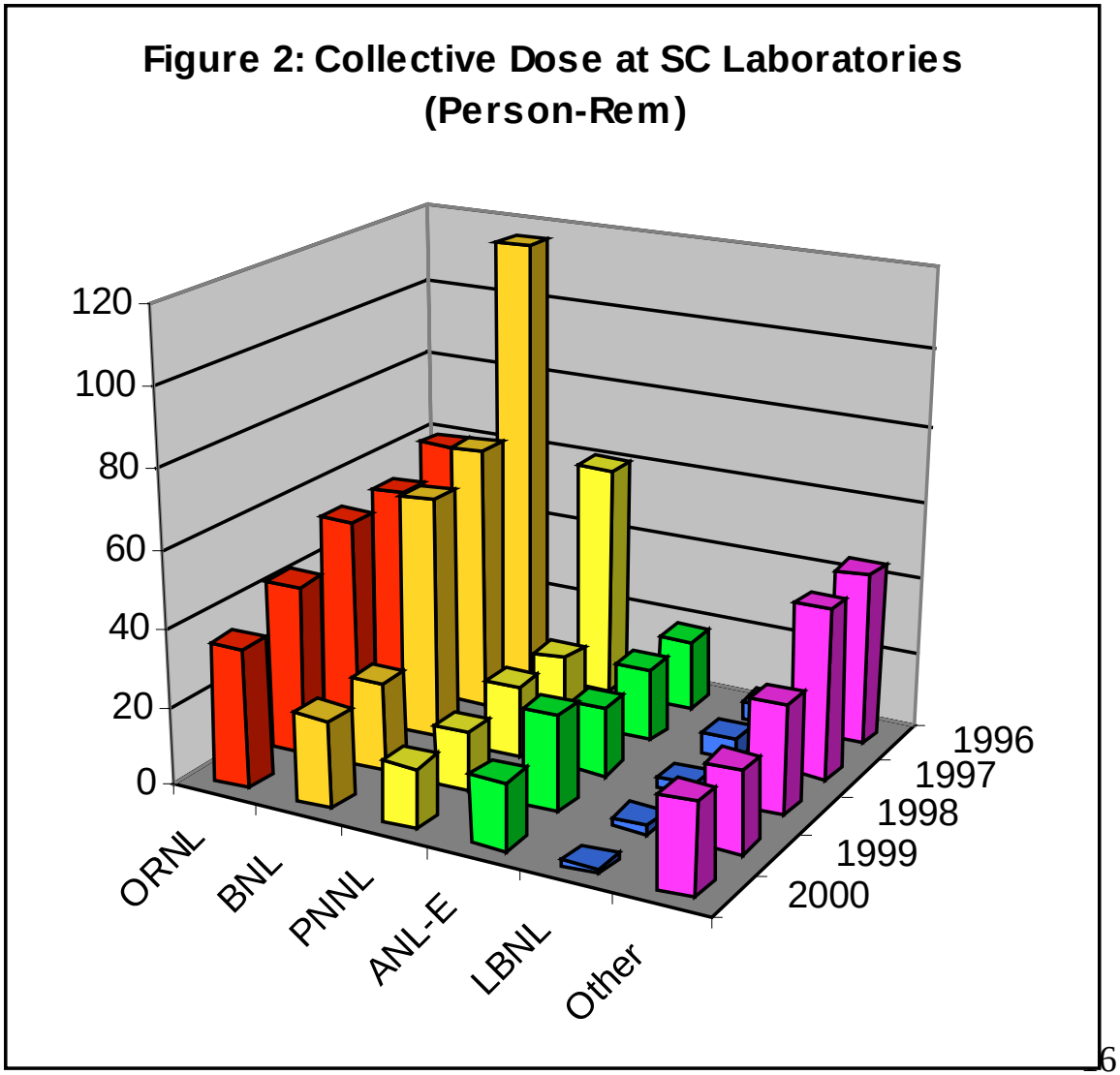
Collective Dose
- Down 60 %
- AGS, HFBR, BMRR
- Bldgs 324, 327
- CP5
- HFIR, REDC

Average Dose

Dose Distribution

Occurrences

Laboratory Profiles



CLOSING THOUGHTS

TO MATURE SAFETY PERFORMANCE, SC WANTS TO:

- STAY THE COURSE WITH THE ISM FRAMEWORK
- LOOK FOR IMPROVED WAYS TO MEASURE PERFORMANCE
- CONTINUE TO IMPROVE EFFECTIVENESS WHILE DOING IT AT LOWER COST

SAFETY MANAGEMENT IS ABOUT THINKING, LEARNING AND COMMUNICATING IN REAL TIME, ALL THE TIME